INSTRUCTIONS

PARALLEL LOW PRESSURE FUEL SYSTEM

DESCRIPTION

This fuel system is a dual (running in parallel) fuel header arrangement, allowing fuel to flow to both the right and left bank cylinders simultaneously. This plan provides for a more even and timely fuel distribution. The large diameter headers provide ample fuel delivery to the high pressure pumps, thus achieving improved fuel consumption.

FUNCTION

The fuel system consists of the following components, listed according to fuel flow from the fuel tank and thru the system, Figs. 1 and 2:

FUEL TRANSFER PUMP

Fuel is drawn from the tank by the electric motor-driven fuel pump (positive displacement) and is rated at 7 GPM. This pump will be used on both 12 and 16 cylinder engines. The primary reason for 7 GPM pumps is to circulate excess fuel providing increased fuel heating for the tank during severe winter conditions, Fig. 2.

RELIEF VALVE

The relief valve is located in the fuel system between the transfer pump (booster pump) and the fuel tank. It is set to open at 75 psi pressure and return bypassed fuel to the fuel tank. The valve protects the pump system against excessive pressure caused by clogged filters or fuel flow stoppage in the pressure side of the system, Fig. 2.

PRIMARY FILTER

The primary filter is a two-stage filter of 13-15 micron rating. Because of the large area (over twice as much as before), filter life is expected to last longer than a 90-day maintenance and would be changed out in that time period. It is located between the fuel transfer pump and the two spin-on filters, on the right side of the diesel engine, Fig. 2.

FIG. 1, E-29146

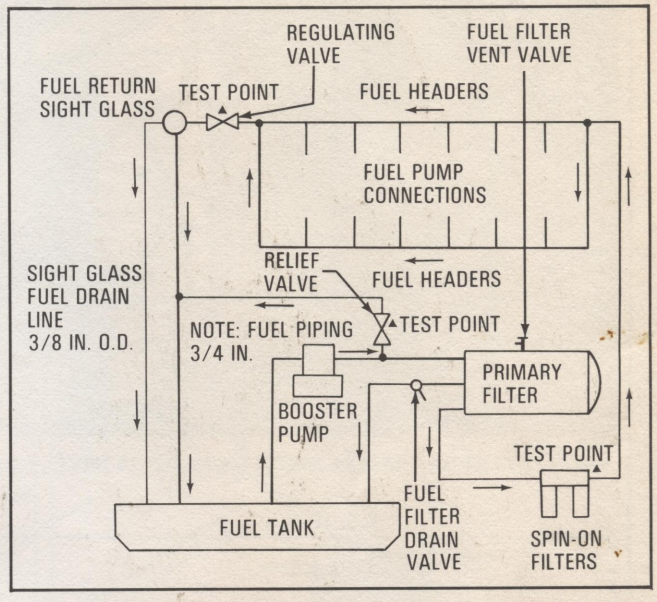

FIG. 1. PARALLEL LOW PRESSURE FUEL SYSTEM SCHEMATIC.

SPIN-ON FILTERS

Two secondary spin-on type filters (in parallel) are located after the primary filter and are connected directly to the fuel headers. These are 20 microns, which is adequate for the system and will permit longer life, Fig. 2.

FUEL HEADERS

Fuel passing through the spin-on filters is piped to each bank of cylinders. The two sides are in parallel. The headers are 5/8 in. I.D. to provide for the proper quantity of fuel to be delivered to the high pressure pumps. This achieves improved fuel consumption. The inner-connecting fuel hoses are made of a high-temperature rated material which is not only resistant to heat, but also non-sensitive to engine vibration, Figs. 2 and 3.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

Verify numbers for parts, tools, or material by using the Renewal Parts or Tool Catalogs, or contact your General Electric representative for assistance. Do not order from this publication.

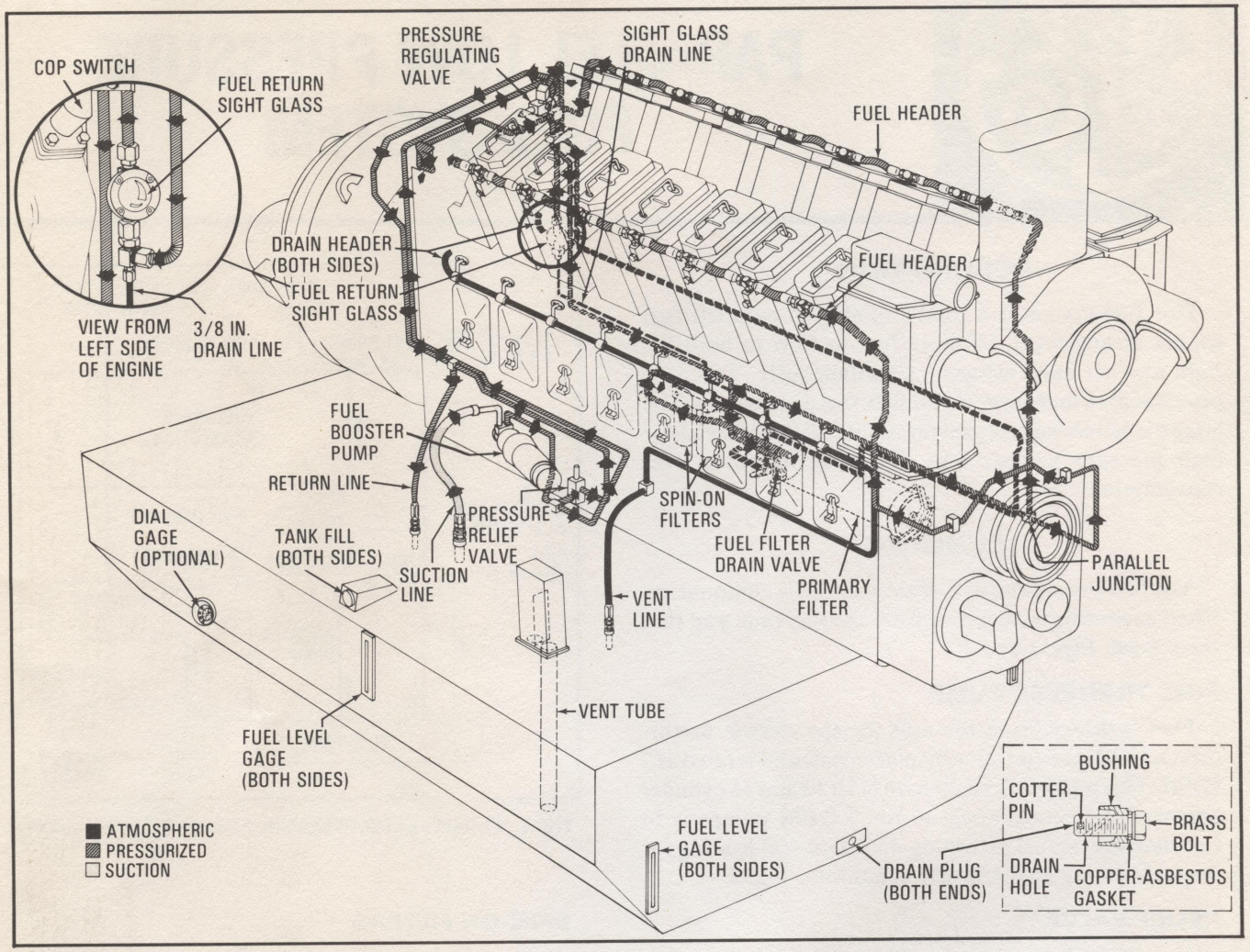

FIG. 2, E-29147

FIG. 2. TYPICAL PARALLEL FUEL OIL SYSTEM.

FUEL PUMP CONNECTIONS

These fittings are of a rugged "banjo" type construction, consisting of three basic parts: tee fitting, "banjo" fitting (housing) and bolt, Figs. 4 and 5. Because of the rugged design, the "banjo" fitting is highly resistant to engine vibration, making fuel leaks almost non-existent, Fig. 6.

REGULATING VALVE

A regulating valve (for header pressure) is located near the top of the main generator. It is identical to the relief valve but is set to maintain header pressure at 40 psi, Fig. 7.

FUEL RETURN SIGHT GLASS

An in-line sight glass is located in the piping after the regulating valve, and mounted near it. This sight glass should have fuel in it when all is proper and is used to indicate fuel flow after starting the fuel pump instead of a fuel pressure gage. The sight glass also has a Teflon* ball in it to indicate flow. The amount of ball movement will vary with flow, being stationary when flow is less than 1 GPM. This may occur at full power, especially with partially dirty filters. A 3/8 in. vent pipe located in the elbow fitting supporting the fuel return sight glass enables the fuel to drain from the sight glass back into the fuel tank when the diesel engine is shut down, Fig. 7.

TEST POINTS

Three test points are provided for the parallel fuel system. These are on the bodies of the relief valve, regulating valve and next to the spin-on filters. These

*Product of E.I. du Pont de Nemours Co.

FIG. 3, E-27461A

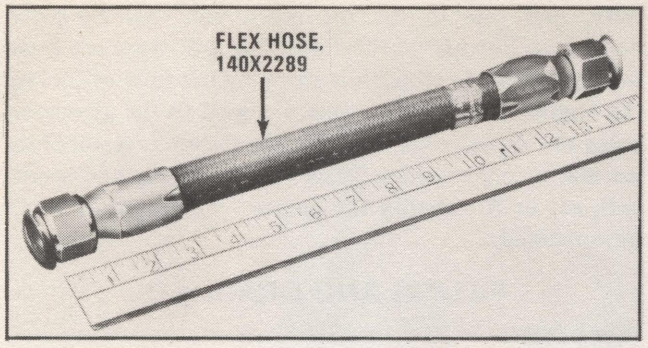

FIG. 3. 5/8 IN. I.D. FLEXIBLE HOSE.

FIG. 4, E-27460

FIG. 5, E-27465

FIG. 6, E-27464

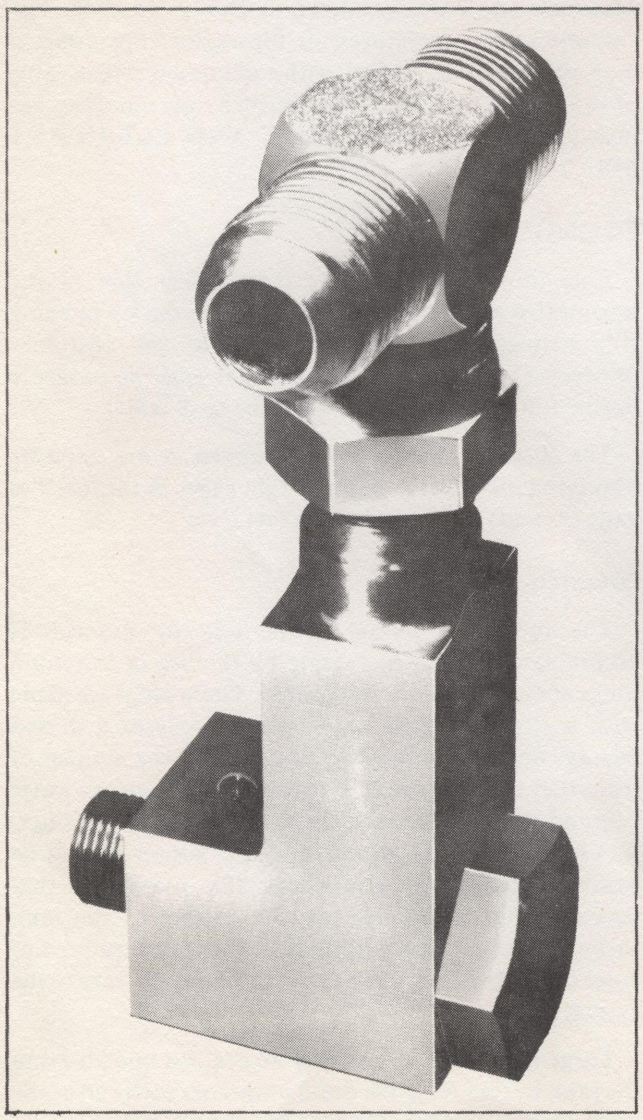

FIG. 4. "BANJO" FITTING ASSEMBLY.

three test points are provided with a HANSEN HK B2-K16 quick-disconnect which is a suggested ARR standard, Fig. 7.

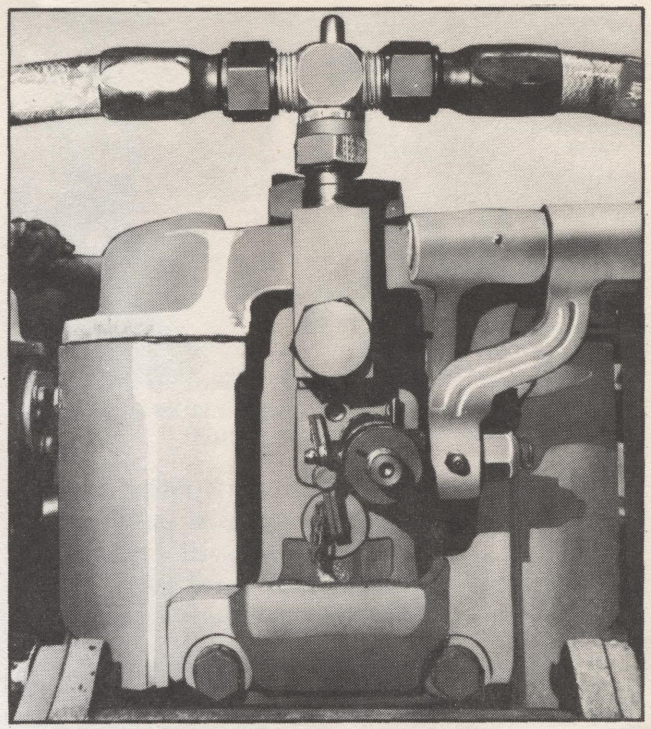

FIG. 5. TYPICAL "BANJO" FITTING ASSEMBLED TO FUEL PUMP.

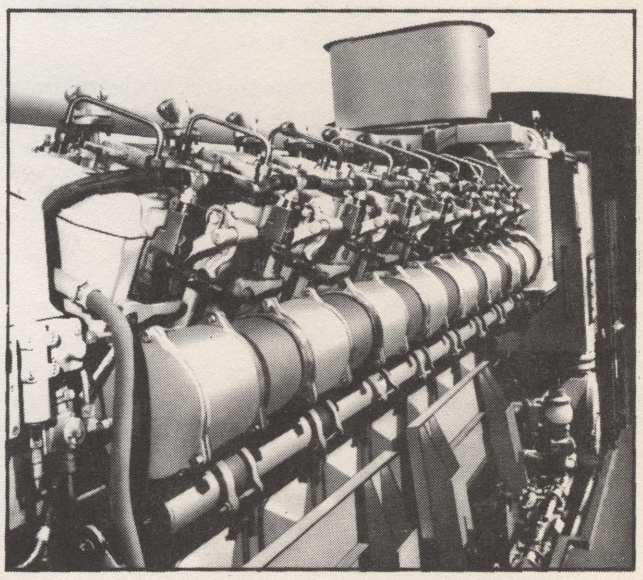

FIG. 6. TYPICAL 16 CYLINDER ENGINE, RIGHT CYLINDER BANK WITH "BANJO" FITTINGS, TEES AND FLEX HOSES.

ENGINE DRAIN SYSTEM

A slight leakage of fuel from the injection pump and the fuel injector nozzle on each power cylinder is normal, since this is required to lubricate the pump and nozzle parts. The fuel leakage must then be drained to the fuel tank.

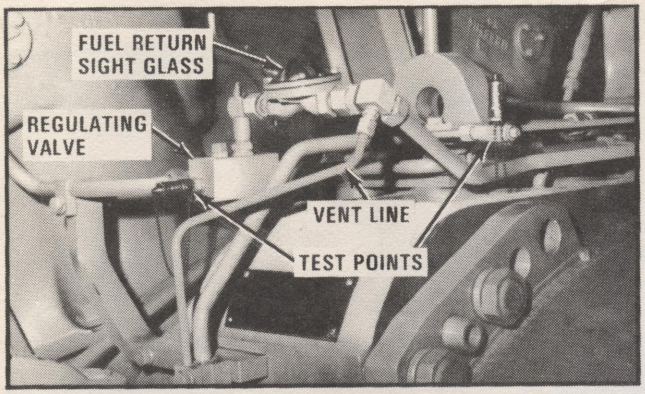

FIG. 7. TYPICAL TEST POINTS AND FUEL RETURN SIGHT GLASS WITH VENT TUBE ATTACHED.

A system of passages within each cylinder assembly conducts leakage fuel through the upper portion of the cylinder, around the base of the injection pump, and downward through the pump push-rod cavity. Fuel is drained from each injector cavity to the return passage.

A passage in each cylinder base is aligned with drilled passages within the engine main frame. A fuel-drain header pipe is attached to each side of the engine main frame and connected to each of these passages to collect drainage fuel. Each header pipe is constructed with an open standpipe at one end. The other end is connected to return drainage fuel to the fuel tank.

The fuel drain system must remain free of obstructions to permit gravity flow of fuel to the tank. If the system should become clogged, fuel dilution of the lubricating oil will occur, Fig. 2.

FUEL TANK

Units are equipped with a single fuel-supply tank, centrally located below the platform. The tank is equipped with two fill openings, one on each side of the tank. Two fuel-level sight gages, one near each fill opening, are standard equipment on the tank. Fuel-level dial gages may be applied to the tank as optional equipment. The bottom of the tank serves as a sump and is equipped with a drain plug at each end. One vent pipe vents the tank to atmosphere.

ELECTRIC EMERGENCY FUEL CUT-OFF SYSTEM

The electrically operated, emergency fuel cut-off system is arranged with three emergency trip switches; one located on the right side just forward of No. 1 lifting lug; one on the left side just above the No. 1 end of the fuel tank; and one in the operator's cab. Momentarily depressing any one of these switches will cause the fuel-booster pump to stop, thus stopping the flow of fuel to the engine. At the same time, a signal to the governor stops the engine. Once tripped, the system is restored to normal by depressing a "reset" button in the operator's cab; or, upon starting the engine, the system is reset automatically.

FILLING AND DRAINING

FUEL OIL

The fuel oil recommended for the engine is distilled fuel and should conform to the American Society for Testing Materials (ASTM) Specification D-975 No. 2-D. For extreme low temperatures, or for engines operating at high altitudes, No. 1D fuel, with a minimum cetane value of 45, may be used. For further information, see instructions TAB RM-4, FUEL AND LUBRICANT SPECIFICATIONS.

FILLING

Fuel filling may be done from either side of the locomotive by applying the fuel hose to the fill opening (fill fittings may differ, depending on customer preference). Observe the upper sight gage periodically during filling to determine when the tank is full.

The fuel supply may be determined at any time by observing the upper and lower sight gages or the fuel dial gage (if used) for the indicated fuel level.

DRAINING

The fuel tank should be periodically drained of accumulated water condensate by the use of the drain plugs at each end of the tank sump. These plugs are made with a straight-thread screw which contains a drilled passage and has an internal stop to limit the number of turns they can be opened. If an excessive amount of water is found in the fuel tank, a check of the engine fuel filter, fuel heater (if used) system, and fuel supply should be made immediately. Also check the possibility that leakage from a cylinder may be getting to the tank through the fuel return headers. If water is permitted to enter the fuel system, it can cause extensive damage to the system parts.

Large quantities of fuel may be drained quickly from the tank by removing the drain plug from each end of the tank sump. The sump end-covers may be removed to gain access to the tank when internal cleaning becomes necessary.

FIG. 7, E-29144